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20 OCT 1969

MEMORANDUM FOR: Director, CIA Reconnaissance Programs

SUBJECT : OSP's NRO Quarterly Report on NRP Satellite Systems

Attached for your consolidation into an overall CIA Reconnaissance Report is OSP's NRO Quarterly Progress Report. Two additional copies are attached for Dr. McLucas and General Berg, and one copy each of CORONA [redacted] is attached for forwarding to SAFSP. 25X1 NRO

[redacted] 25X1 NRO

JOHN J. CROWLEY
Director of Special Projects

Attachments: a/s

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NRO review(s) completed.

[redacted]

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SUBJECT: OSP's NRO Quarterly Report on NRP Satellite Systems

Distribution:
Cys 1 thru 4 - D/Recon(w/att)
5 - D/OSP(w/att)
6 - DD/OSP(w/att)
7 - EO/OSP(w/att)
8 - C/PAD/OSP(w/att)
9 - C/D&AD/OSP(w/D&AD att)
10 - D/PRS/OSP(w/C att) 25X
11 - PD/ 25X1
12 - RB OSP(w/att) NRO
13 - RB/DD/S&T(w/att)✓
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DD/S&T/OSP/PAD/PPBB/ 25X

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QUARTERLY PROGRESS REPORT

SATELLITE SYSTEMS

1 July 1969 through 30 September 1969

I. CORONA PROGRAM

A. J-1 System Status

1. Mission 1052 (J-46): The last J-1 Payload was successfully launched 22 September 1969. Originally scheduled for 17 September, the launch date was slipped due to problems in the vehicle command box and booster hydraulic system. The slope programmer failed to start on Revs. 21 and 38, otherwise all systems functioned normally.

2. The first and second recovery vehicles were successfully recovered via aircraft on 29 September and 7 October 1969 respectively. No significant problems were evident on either half of the mission. Preliminary evaluation of the processed film from the first recovery indicated that it was a normal J-1 mission take. An MIP of 8[illegible] was assigned.

B. J-3 System Status

1. Mission 1107 (CR 7) was successfully launched on 23 July 1969. PET stated "The general image quality of the aft-looking camera record is comparable to what was expected from that instrument considering the operational aspects of the mission; i.e., altitude (100 NM vs. 85 nominal for J-3's) launch time and the measured quality of the lens." The mission received an MIP rating of 95. At Rev. 1 KODI, during the first operation, the forward-looking instrument (No. 315) failed. The aft-looking instrument continued to function normally. The DISIC Subsystem operated satisfactorily until Rev. 282, at which time the system jammed.

[redacted]

[redacted]

2. A thorough examination of all available data resulted in the probable determination of the failure mode experienced by the forward-looking camera; however, the actual cause is still uncertain. Two possible causes have been hypothesized:

a. Film restriction or film velocity reduction at the shuttle input.

b. Film restriction at the supply cassette.

As the actual cause of failure is unknown, no corrective action is being taken at this time. However, if future events provide more definitive data corrective action will be considered.

3. Evaluation indicates that the most probable cause of the DISIC stall was a drag on both the stellar and terrain films. Several areas are being investigated by Fairchild Camera and Lockheed personnel. Their recommendations are due by mid-October 1969.

C. Ultra Thin Base Film Usage in the CR Camera System

1. CR-8 qualification tests have been completed. These included POGO vibration (3.5 G's), acoustic, and simulated shock. All UTB film modifications were successfully qualified. Minor hardware problems and questionable workmanship items were noted. Corrective actions have been implemented for CR-9 and all successive systems.

2. The thermal/vacuum tests (described in the last Quarterly) are completed. Estimated release date of final report is 15 October 1969.

3. The next UTB flight will be CR-11 (Mission 1109) scheduled for 18 February 1970. The Dr. Aschenbrenner Grid Test will be conducted on this system during environmental testing. Based on acceptable results in future testing the system will use a full load, 48,000 feet, of UTB film.

4. Although it has completed its original acceptance level vibration, CR-9 is currently being prepared for another vibration test to ensure that corrective action has been successful. See I.C.1. above. The vibration levels for this test are being reviewed.

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5. Test of a low R.H. UTB film roll will be conducted at the Boston ITEK facility. After drying of the roll, the film will be forwarded to E.K. for respooling at normal tensions and concurrent monitoring of static discharge. Upon return to ITEK, a series of Dr. Aschenbrenner Grid Tests and evaluation of resultant data will be accomplished using CR-8. These tests will determine the effectiveness of utilizing pre-dried film in operational endeavors.

D. Proposals and Future Changes

1. CR-14 and subsequent systems will utilize .040 inch glass filters in the primary position. CR-8 refurbishment will include change to glass filters and is therefore included in the subsequent category. Additionally, it is planned to use a .037 inch glass filter in the alternate filter position. This will allow a small focus adjustment during on-orbit operations. Film evaluation of the A portion will allow selection of the better focus during the B portion.

2. Splices: The ultrasonic splice testing at AP is completed. The test report will be released 20 October 1969.

E. ITEK, Boston, will refurbish CR-8 after its qualification starting in early December 1969. The system will be returned to AP in September 1970. General Electric will refurbish the SRV's during the same time span.

F. A new CORONA flight schedule has been approved. One flight during the remainder of C.Y. 1969, four flights for C.Y. 1970, and five flights for C.Y. 1971. The last CORONA flight is scheduled for November 1971.

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G. To utilize more effectively Government personnel for [redacted] 25X
25X1 the CORONA [redacted] Program, [redacted] have been 25X
NRO combined. Direction of [redacted] is maintained in OSP by the Photographic Reconnaissance Systems Office. Field direction to [redacted] 25X1
25X1 CORONA [redacted] contractors is maintained by the West Coast NRO
NRO project office presently located at the A/P, with temporary office space
25X1 in building No. [redacted] in the LMSC complex in Sunnyvale.
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H. Missions Completed This Quarter

Mission No.	1107	1052
Booster No.	69-038	68-300
Agena No.	1652	1653
Payload No.	CR-7	J-46
Instrument No.	314/315	216/217
S.I. No.	S/N-11	D-110/111
Film Type (Main Instruments)	3404	3404
Flight Date	24 July 69	22 Sept 69
Feet Payload Flown	32,600 feet	32,600 feet
Feet Payload Recovered	16,570 feet	32,600 feet
Recovery Date:	2 Aug 69	29 Sept 69
	12 Aug 69	7 Oct 69

I. Missions Planned For Next Quarter

Date - 26 November 1969
Mission 1108
Payload CR-9

J. Meetings and Briefings

1. PET meeting for Mission 1107 was held at NPIC 3-5 September 1969.

2. Special engineering review for Mission 1052 was conducted by the SPD (Gen. King) at VAFB on 10 September. The normal R-. meeting on this mission was conducted on 1] September at VAFB.

3. Mission 1052 PET meeting will be convened at NPIC 28-29 October 1969.

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18 APR 1969

MEMORANDUM FOR: Director, CIA Reconnaissance Programs

SUBJECT : OSP's NRO Quarterly Report on NRP SATELLITE SYSTEMS

Attached for your consolidation into an overall CIA Reconnaissance Report is OSP's NRO Quarterly Progress Report. Two additional copies are attached for Dr. Flax and General Berg, and one copy each of CORONA [redacted] 25X1 NRO is attached for forwarding to SAFSP.

[redacted] 25X1 NRO

JOHN J. CROWLEY
Director of Special Projects

Attachments: a/s

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14 of 18 -
15 of 18 - COR/OSP(w/C att)
16 of 18 - RB/OSP(w/att)
17 of 18 - RB/DD/S&T(w/att)✓
18 of 18 - PPBB File

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QUARTERLY PROGRESS REPORT

SATELLITE SYSTEMS

1 January 1969 through 31 March 1969

I. CORONA PROGRAM

A. J-1 System Status

1. Open Items From Last Quarter

a. Agena Battery Failure - During Mission 1049 two batteries in the Agena power supply failed. The most probable cause was internal battery failure. To preclude the recurrence of this failure, more stringent controls are being used during activation and final checkout of the batteries.

b. Main Instrument Out-Of-Focus - The imagery from J-50 was described as being "generally out-of-focus." The Payload Evaluation Team attributed the anomaly to the higher than normal temperature. Action taken was to tighten controls concerning thermal coating surface, stricter launch window limits, and review of ascent temperatures.

2. J-43 Flight Summary

a. On 19 March 1969 J-43 (Mission 1050) was successfully launched. On Rev 22 T/M data indicated that the Agena attitude control system was malfunctioning. The failure mode produced a yaw rotation of approximately one-half degree per second. The failure was attributed to a malfunctioning valve. Abnormally high consumption of control gas required that the Mission be shortened to four days. Successful recovery of both buckets was accomplished by use of the lifeboat system.

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b. In the event of a failure of the primary attitude control module the lifeboat system aligns the vehicle with the earth's magnetic field by use of a separate pneumatic control system.

c. Selected portions of the Mission past Rev 22 were usable to some extent. These will be duplicated and distributed to the users. However, only fifteen percent or 990 cycles were obtained before the malfunction occurred. This significantly reduced the requirements satisfactorily covered by Mission 1050.

B. J-3 System Status

1. CR-6 Summary

On 5 February 1969 CR-6 (Mission 1106) was successfully launched. Two important firsts were accomplished on the Mission -- successful operation of the Digital Shift Register Command System (DSR) and satisfactory performance of the first non-gold thermal coating.

Immediately prior to the flight an extensive commanding exercise was conducted. The exercise involved Vandenberg AFB tracking station sending RF commands to a receiver/DSR/TM transmitter breadboard installed in a contractor facility at VAFB; the breadboard "looked" to the tracking station like an in-flight system. The exercise included all of the tracking station/Satellite Test Center (STC) communications and T/M verifications interfaces. The exercise confirmed confidence in the DSR Command System.

By the end of the first day of Mission 1106 the only serious problem remaining with the Satellite Control Facility was some inadequately debugged software in the Auggie System (Auggie is a digital printout of selected T/M data points). This deficiency caused bad data printouts at STC for certain system parameters and contributed to our failure to detect two wrong loads. The Auggie problem was fully corrected for all stations by Rev 38.

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During the Mission several DSR anomalies occurred. They are described below:

a. Two loads were wrong due to a DSR shifting malfunction. The result was that all operates on Rev 9 were moved south by approximately 26 degrees; for Rev 22 the operates were moved south by approximately 40 degrees. Further testing is being performed to define actual failure mode and recommend corrective action.

b. One load was wrong due to an improper procedure. On Rev 57 at the prime command station the command load was sent, but no verification was obtained. At the back-up station, after verification was made, the execute command was sent. After the pass, T/M showed an erroneous word in the output register, resulting in the shifting of all operates 26 degrees south.

This mode is normal when the load command and execute command are sent at two different stations and a T/M off brush occurs between the stations. A change in procedure has been made to preclude the recurrence of this problem.

c. One load was wrong because of a human error; however, the denied area operation was correct because of a fortunate brush sequencing.

d. Two loads could not be verified, and, therefore, the emergency back-up command system was enabled. The first occurrence was Rev 4 before all stations had had actual experience with the DSR. Immediate action was taken to adjust their command verification voltage levels, and no recurrence of this problem occurred.

The second case occurred on Rev 85; Guam's STC Computer contact was lost during pass. The action taken was to begin DSR loading as early as

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possible in pass. In addition, the tracking stations practiced procedures for fast voice readback during post recovery exercises.

In spite of the problems encountered during Mission 1106, the flight is considered a successful demonstration of the DSR System.

CR-6 was the first system to use the Mystic aluminized tape instead of the gold thermal surface. The new surface produced temperatures that were both uniform and predictable.

Four subsystems failed during the flight -- the automatic V/H control, the automatic exposure control, the aft-looking instrument, and the payload tape recorder. These are described below:

(1) The V/H programmer failed to start after launch. Proper V/H match was maintained during the major portion of the mission by real time commands. The cause was reasoned to be an open circuit supplying current to an oscillator in the programmer. Additional cyclic testing and inspection of programmers will be made in future systems.

(2) The automatic aperture control (switch programmer) failed on Rev 22. The proper aperture setting was maintained by real time commanding with no serious exposure errors.

Failure analysis indicated that a relay failed to operate. This relay has a failure rate of 0.4 per 1000. Normal inspection and testing will continue pending review of failure reports on the switch programmer.

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(3) The aft-looking instrument failed on Rev 105, approximately half way through the SO-121 (color film) and approximately 86 percent through the total mission.

It is believed that a mylar splice failed. Flight requirements necessitated a mixed roll of 3404/SO-121. Mylar splices were required because permacel splices would have activated the Material Change Detector (MCD) at each splice. Possible corrective action is being reviewed.

(4) The "B" SRV recoverable tape recorder failed. The vendor's failure report stated that an oscillator failed. These recorders were refurbished and the first such to be utilized during a mission. During refurbishment the oscillator was not replaced. In future refurbishments this will be done.

2. Proposals and Future Changes

a. Glass Filters - CR-14 and up will use glass filters.

b. Splices - A/P has started a series of ultrasonic splice tests. The first series of tests will be completed by May 1969.

c. A constant tension device is being incorporated in future J-3 systems. This mod should reduce tension transients during operation.

d. Itek is conducting special UTB test as outlined by the UTB Task Team.

C. There exist only two J-1 systems; one of these will be launched by the end of fiscal year 1969; the last one will be launched in September 1969. Eight J-3 systems remain in house; one of the above J-3 systems will be used in July 1969. Itek will deliver the last three J-3 systems by end of the fiscal year. The last CORONA flight is presently scheduled for May 1971.

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D. Deliveries to A/P

1. SRV Deliveries

743R/744R - February 1969
825/826 - February 1969

2. Main Instrument Delivery

S/N - IR 328/329 - March 1969

E. Missions Completed This Quarter

Mission No.	1106	1050
Booster No.	519	541
Agena No.	1650	1651
Payload No.	CR-6	J-43
Instrument No.	312 /313	210/211
SI No.	--	D113/114
DISIC No.	6	--
DRCG No.	627	611
Film Type	3404	SO-230
Flight Date	5 February 1969	19 March 1969
Feet Payload Flown	29394/3404 2000/SO-121	32606/SO-230
Feet Payload Recovered	29394/3404 911/SO-121	24877/SO-230
Recovery Dates	9/14 February 1969	21/22 March 1969

F. Missions Planned For Next Quarter

Date	14 May 1969
Mission	1051
Payload	J-44

G. Meetings

1. PET Meeting for Mission 1049 on 6 through 8 January 1969.

2. UTB Task Team met at A/P on 4 February 1969.

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3. Brigadier General Edward T. Podufaly was given a CORONA Briefing and a tour of the A/P Facility on 24 March 1969. General Podufaly is Commander of the Army Topographic Command which has recently been activated and assumes Topographic Command functions.

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